

Application to Amend Vista Ridge Drilling and Operating Permit No. POS-D&O/A&M-001d and Transport Permit No. POS-T-0001d

February 13, 2020



BLUEWATER
VISTA RIDGE

 **RW HARDEN
& ASSOCIATES**^{INC}
GROUNDWATER RESOURCE PROFESSIONALS

TERRILL & WALDROP
ATTORNEYS and COUNSELORS

OUTLINE

- Current Permit Overview
- Requested Permit Amendments
- Applicable District Rules
- Overview of Vista Ridge Hydrology
- Modifications to Groundwater Availability Model
- MODGAM Results

CURRENT PERMIT OVERVIEW

- 33 Permitted Wells
 - 21 Carrizo Wells
15,000 acre-feet per year
 - 12 Simsboro Wells
35,993 acre-feet per year
- 50,993 acre-feet per year
- For municipal use
- Transport authorized to several counties including Bexar.

PERMIT AMENDMENTS

1. Relocate PW-18 Permitted Well Site;
2. Increase Simsboro Well Field Production by 4,842 acre-feet/year;
3. Reinstate 3,000 gpm maximum production rates for Wells PW-12, PW-13, and PW-16; and
4. Adjust transport permit to be consistent with changes in operating permit.

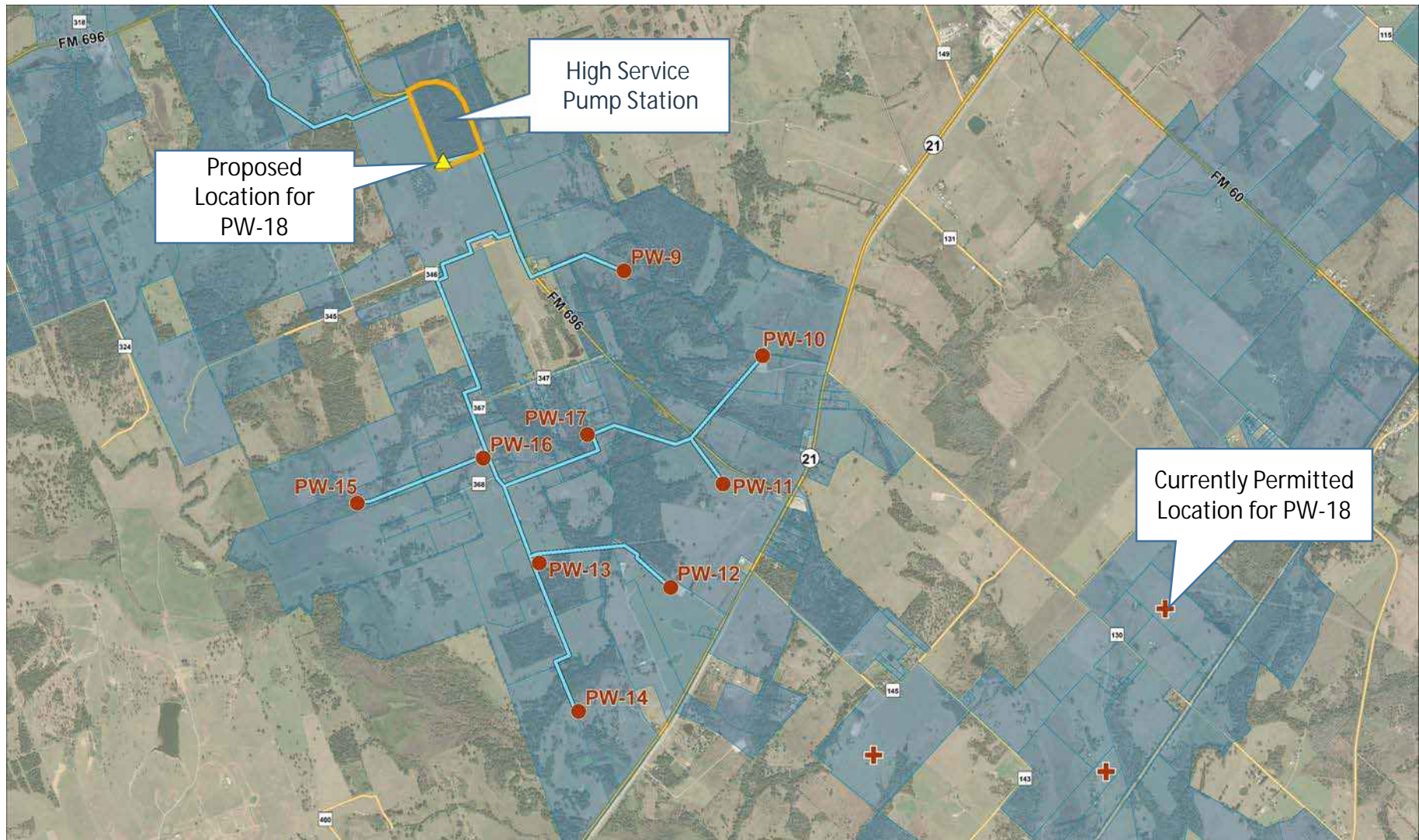
PURPOSE OF PERMIT AMENDMENTS

- Relocation of PW-18 provides additional supply well at High Service Pump Station for greater operational flexibility and redundant capacity;
- Additional Simsboro production needed to comply with make-up water requirements of SAWS contract and for potential evaporation and line loss;
- Reinstatement of maximum production rates provides operational flexibility for well field in anticipation of down time for repairs and maintenance.

PERMIT AMENDMENT ONE

- Relocate PW-18 from its current permitted location to property where the Vista Ridge High Service pump station is located
- No change to any permit parameters other than point of withdrawal

WELL FIELD



DISTRICT RULE 4.1.7

7. Upon application, and approval by the District, a well location established by permit may be modified on the request of both the permittee and the surface owner of land within the contiguous area included within the permit, or for the purpose of relocating the well to a site that is more secure from flooding, adverse drainage or any source of potential contamination.
[Amended May 3, 2017]

SIMSBORO WELL SPACING

POSGCD Rule 4.1.2.a

a. the spacing of a new well from any well existing in that formation shall be a distance of not less than one foot per one gallon per minute of production capacity and not less than one-half foot per gallon per minute from the property line of each adjoining landowner; or

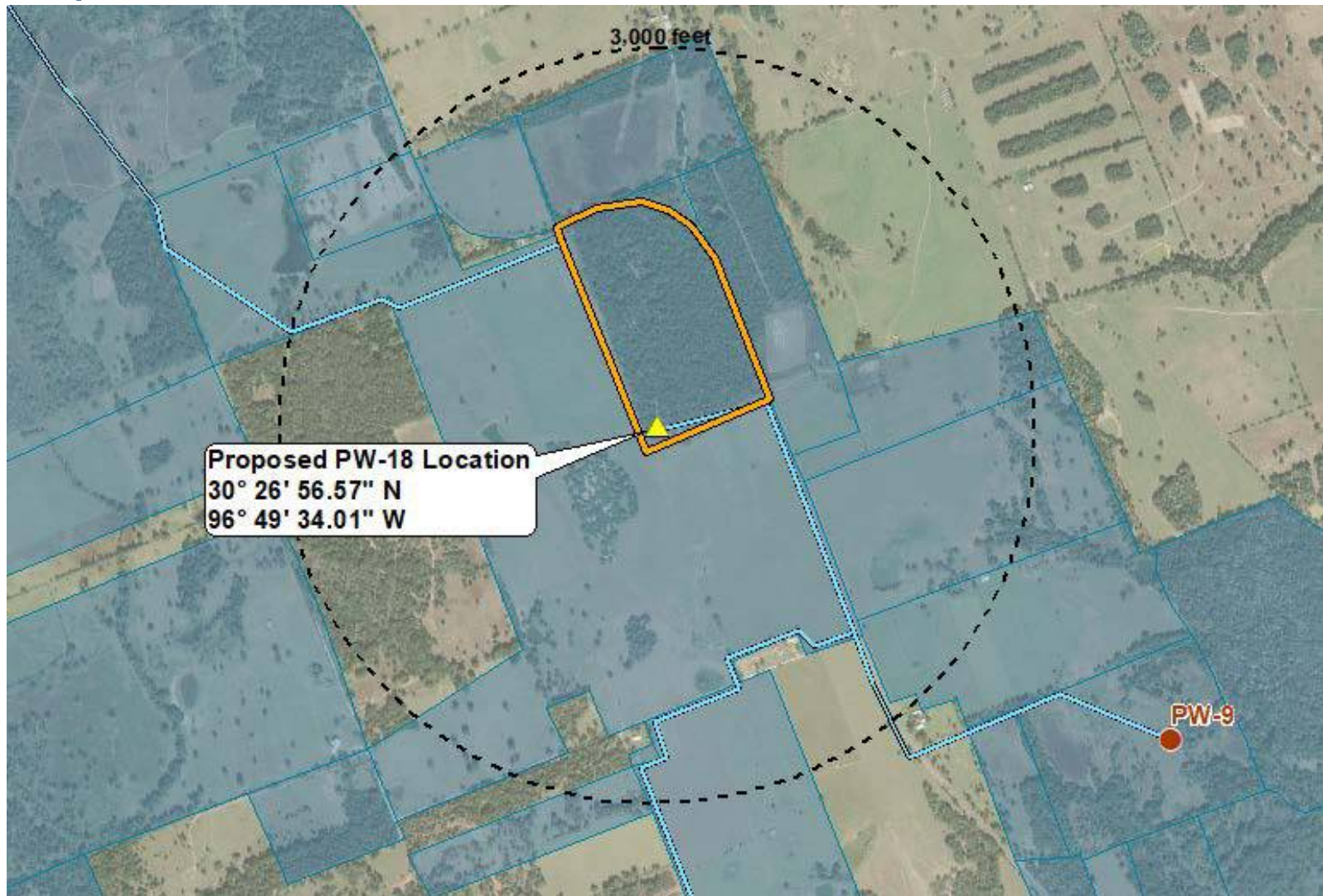
Property Line

$\frac{1}{2}$ ft. per GPM from
property line

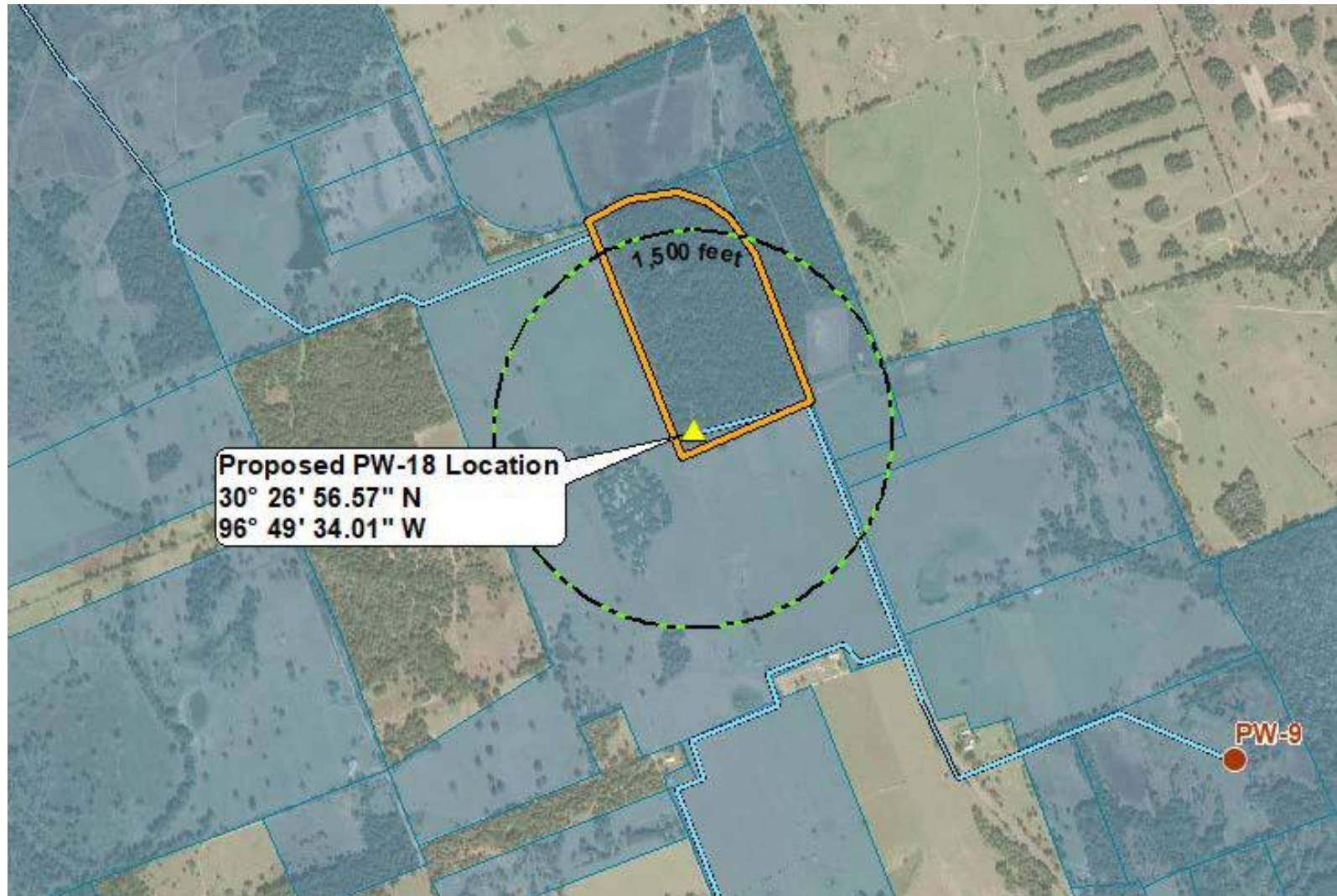
Well Spacing

1 ft. per GPM from
existing well in
same formation

Compliance with Well to Well Offset Requirement



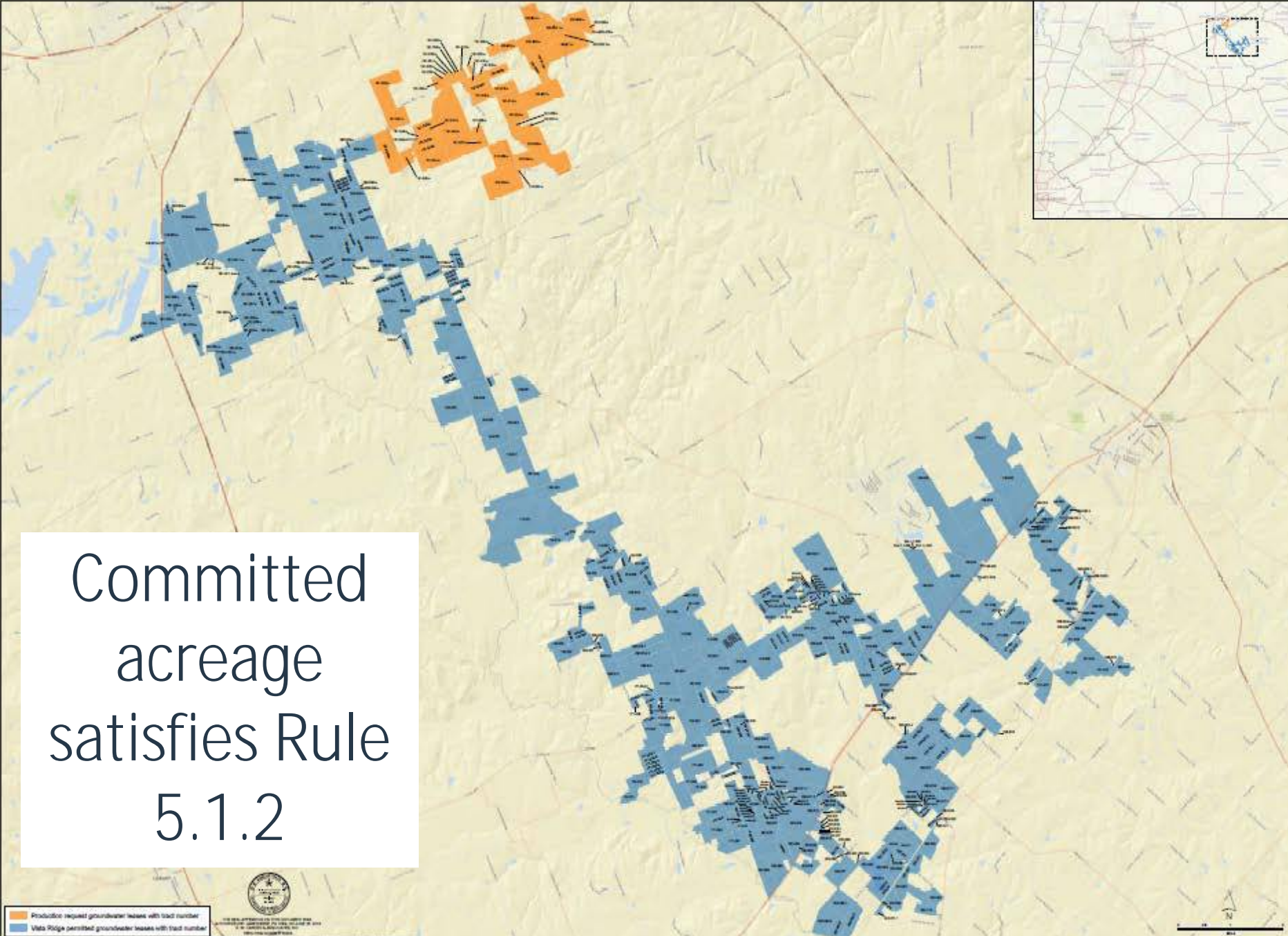
Compliance with Well to Property Offset Requirement



PERMIT AMENDMENT TWO

- Increase in annual Simsboro production from 35,993 acre-feet to 40,835 acre-feet

Committed
acreage
satisfies Rule
5.1.2



Production request groundwater leases with tract number

Vista Ridge permitted groundwater leases with tract number

THE TEXAS DEPARTMENT OF AGRICULTURE
DIVISION OF WATER RESOURCES
1000 WEST 10TH STREET, SUITE 1000
FORT WORTH, TEXAS 76102
WWW.DWR.STATE.TX

Lease Schedule for Blue Water Vista Ridge LLC

Tract	Tract Acres	Net Acres	Lessee	Lease Date	Recording Data
002-018	52.842	52.842	Clint J. Luksa	11/3/2004	844/778 B.C.O.P.R.
002-025	58.8	58.8	Adell Paukert Mikula	10/29/2004	844/216 B.C.O.P.R.
002-027	5	5	Steve Payne and wife, Patricia May Payne	9/6/2004* [71]	840/148 B.C.O.P.R.
002-028.1	2.357	2.357	M. Dwayne Hill	9/6/2004* [71]	840/726 B.C.O.P.R.
002-028.2	3.444	3.444	M. Dwayne Hill	9/7/2004* [71]	840/730 B.C.O.P.R.
002-029	5.76	5.76	Clint J. Luksa	11/7/2004	844/792 B.C.O.P.R.
002-030	5.76	5.76	William V. Roskey and wife, Mary J. Roskey	10/13/2007	736/463 B.C.O.P.R.
002-031	5.76	5.76	William V. Roskey and wife, Mary J. Roskey	12/4/2007	736/455 B.C.O.P.R.
002-033	4.9	4.9	Mildred Horak	10/3/2004	843/828 B.C.O.P.R.
002-034	3	3	Isreal T. Rodriguez and wife, Marie Ruth O. Rodriguez	11/2/2004	844/414 B.C.O.P.R.
002-035	1.7178	1.7178	Jerry Glynn Busby, Sr. and wife, Christine B. Landrum Busby	12/19/2004	850/165 B.C.O.P.R.
002-036	3.736	3.736	Jerry Albert Kacer, Jr.	11/3/2004	845/721 B.C.O.P.R.
002-037	45.6	45.6	L.J. Horak	10/14/2004	844/220 B.C.O.P.R.
			Frank Horak	11/2/2004	844/418 B.C.O.P.R.
			Allen Ray Horak	10/13/2004	843/823 B.C.O.P.R.
			Ella Horak	10/13/2004	843/821 B.C.O.P.R.
002-038	10.766	10.766	Phyllis J. Urban	11/19/2004	846/398 B.C.O.P.R.
002-042	60.89	60.89	Frank Horak	10/11/2004	843/817 B.C.O.P.R.
002-043	24.352	24.352	Clint J. Luksa	11/9/2004	844/783 B.C.O.P.R.
002-050	2	2	Martha Jo Lambrecht	12/15/2004	850/161 B.C.O.P.R.
002-051	5	5	David Dennis	11/26/2004	847/662 B.C.O.P.R.
002-056	4.983	4.983	Wayne A. Moore and wife, Margaret L. Moore	11/16/2004	850/112 B.C.O.P.R.

Lease Schedule for Blue Water Vista Ridge LLC

Tract	Tract Acres	Net Acres	Lessee	Lease Date	Recording Data
291-067m	2	2	Michael Skrhak and wife, Jodi Michelle Young Skrhak	12/20/2003	995/165 M.C.O.R.
291-070m	48	48	Velma Young Trust	8/26/2008	1000/278 M.C.O.R.
291-071m	46.6	46.6	Velma Young Trust	8/26/2008	1000/274 M.C.O.R.
291-072m	69.9	69.9	Velma Young Trust	8/26/2008	1000/270 M.C.O.R.
291-078m	49.71	49.71	Robert Keith Luetge	4/3/2006	1007/193 M.C.O.R.
291-081m	32.568	32.568	Curtis D. Kornegay and wife, Blise Jean Kornegay	6/14/2002* [45]	878/801 M.C.O.R.
303-001m	12.161	12.161	Hondo Land and Cattle Company, Ltd.	9/13/2003	986/109 M.C.O.R.
303-002m	293	293	Hondo Land and Cattle Company, Ltd.	9/13/2003	986/113 M.C.O.R.
303-003m	136	136	Hondo Land and Cattle Company, Ltd.	9/14/2003	986/105 M.C.O.R.
303-064m	14.87	14.87	Harry Vowell and Caleb J. Hildebrand	6/22/2006	1014/278 M.C.O.R.
303-065m	4.089	4.089	Harry Vowell and Caleb J. Hildebrand	6/22/2006	1014/875 M.C.O.R.
331-003m	97.6796	97.6796	Velma Young Trust	8/26/2008	1000/266 M.C.O.R.
331-004m	17.997	17.997	Velma Young Trust	8/26/2008	1000/258 M.C.O.R.

Total Net Acres: 25,531.2425

Total Net Acres: 28,958.4362

LEASE SCHEDULES

Lease Schedule for Blue Water Vista Ridge LLC

Tract	Tract Acres	Net Acres	Lessee	Lease Date	Recording Data
090-015m	6	6	Alden D. Crowe and wife, Paula Crowe	12/22/2009* [26]	837/686 M.C.O.R.
146-007m	165.246	165.246	John Andrew Isaacs and wife, Rita Kay Isaacs	2/14/2005	963/856 M.C.O.R.
146-009m	47.09	47.09	Philip M. Oliver and wife, Anne Marie Oliver	3/12/2005	968/364 M.C.O.R.
146-010m	82.5294	82.5294	Charles Howard Helmer	8/23/2003* [58]	924/843 M.C.O.R.
146-011m	192.825	192.825	S & V Partnership	1/19/2005	963/537 M.C.O.R.
191-001m	27.755	27.755	Richard Lunsford and wife, Shirley Jean Lunsford	2/6/2005	963/888 M.C.O.R.
191-003m	13.878	13.878	Glenn D. Downey and wife, Phyllis R. Downey	2/6/2005	966/257 M.C.O.R.
191-004m	78.09	78.09	Joyce Lange	2/8/2005	963/880 M.C.O.R.
191-007m	29.256	29.256	John T. Voyles and wife, Patricia Voyles	3/11/2006	1003/756 M.C.O.R.
191-008m	28.138	28.138	Jimmy W. Voyles and wife, Judy Voyles	3/20/2006	1006/237 M.C.O.R.
191-014m	95.048	95.048	William A. Caserio and wife, Diana M. Caserio	4/5/2006	1006/273 M.C.O.R.

Lease Schedule for Blue Water Vista Ridge LLC

Tract	Tract Acres	Net Acres	Lessee	Lease Date	Recording Data
191-053m	174.594	109.1212	Carolyn Stark Bradshaw	12/17/2001* [39]	862/130 M.C.O.R.
			Linda Kay Furr	12/16/2001* [39]	862/110 M.C.O.R.
			Patricia Darlene Powell	8/14/2001* [34]	833/252 M.C.O.R.
191-055m	41.98	41.98	Amenda Lee Colbert	6/9/2003* [56]	910/756 M.C.O.R.
			Jack Colbert	6/3/2003* [56]	910/740 M.C.O.R.
210-039m	98.389	61.6181	Brian Keith Stark	12/14/2001* [39]	862/122 M.C.O.R.
			Carolyn Stark Bradshaw	12/17/2001* [39]	862/126 M.C.O.R.
			Linda Kay Furr	12/16/2001* [39]	862/114 M.C.O.R.
			Patricia Darlene Powell	8/22/2001* [34]	833/248 M.C.O.R.
210-060m	200	200	William D. Payne and wife, Christine L. Payne	3/2/2006	1002/810 M.C.O.R.
			William Dwayne Payne	3/2/2006	1003/668 M.C.O.R.
210-061m	4.805	4.805	William Dwayne Payne	3/2/2006	1003/672 M.C.O.R.
210-063m	263.551	263.551	Vaughn E. Owens "Pud" and wife, Wilma Owens	12/10/2004	960/311 M.C.O.R.
210-064m	87.276	87.276	Michael B. Brooks and wife, Carol A. Brooks	3/5/2005	968/902 M.C.O.R.
288-043m	176.171	176.171	Joseph Slusher and wife, Judith Slusher	10/16/2009	1005/082 M.C.O.R.
323-002m	35.5	35.5	Jo Blackwell	4/6/2003	971/725 M.C.O.R.
			Leonard F. Roberts	3/14/2005	968/898 M.C.O.R.
			Maurine Lay	4/6/2005	971/721 M.C.O.R.
323-003m	122.08	122.08	Clarence R. Sims	2/24/2005	966/253 M.C.O.R.
			Ronald A. Wall and wife, Karen D. Wall	2/9/2005	966/261 M.C.O.R.
323-004.1m	96.097	96.097	Paul A. Zabor	2/19/2005	966/635 M.C.O.R.
323-004.2m	6.42	6.42	Paul A. Zabor	4/7/2005	971/143 M.C.O.R.
323-005m	82.85	41.423	R. Stephen Rhodes	6/11/2009	1102/643 M.C.O.R.
323-006m	14.363	14.363	R. Stephen Rhodes	6/11/2009	1102/639 M.C.O.R.
323-024m	103.26	103.26	Clarence Theo Krenak and Lillian M. Krenak, as Trustees of The Clarence Theo Krenak and Lillian M. Krenak Revocable Living Trust	3/10/2005	968/339 M.C.O.R.

Total Net Acres: 3,427.1937

PERMIT AMENDMENT TWO

District Rule 7.4.5.(a)

5. Applications for permits for wells that will have a maximum pumping rate that equals or exceeds 500 gpm shall include:
 - a. Predictions of pumping impacts on water levels over the next 30 years within a radial distance of 5 miles of the newly permitted well.

PERMIT AMENDMENT THREE

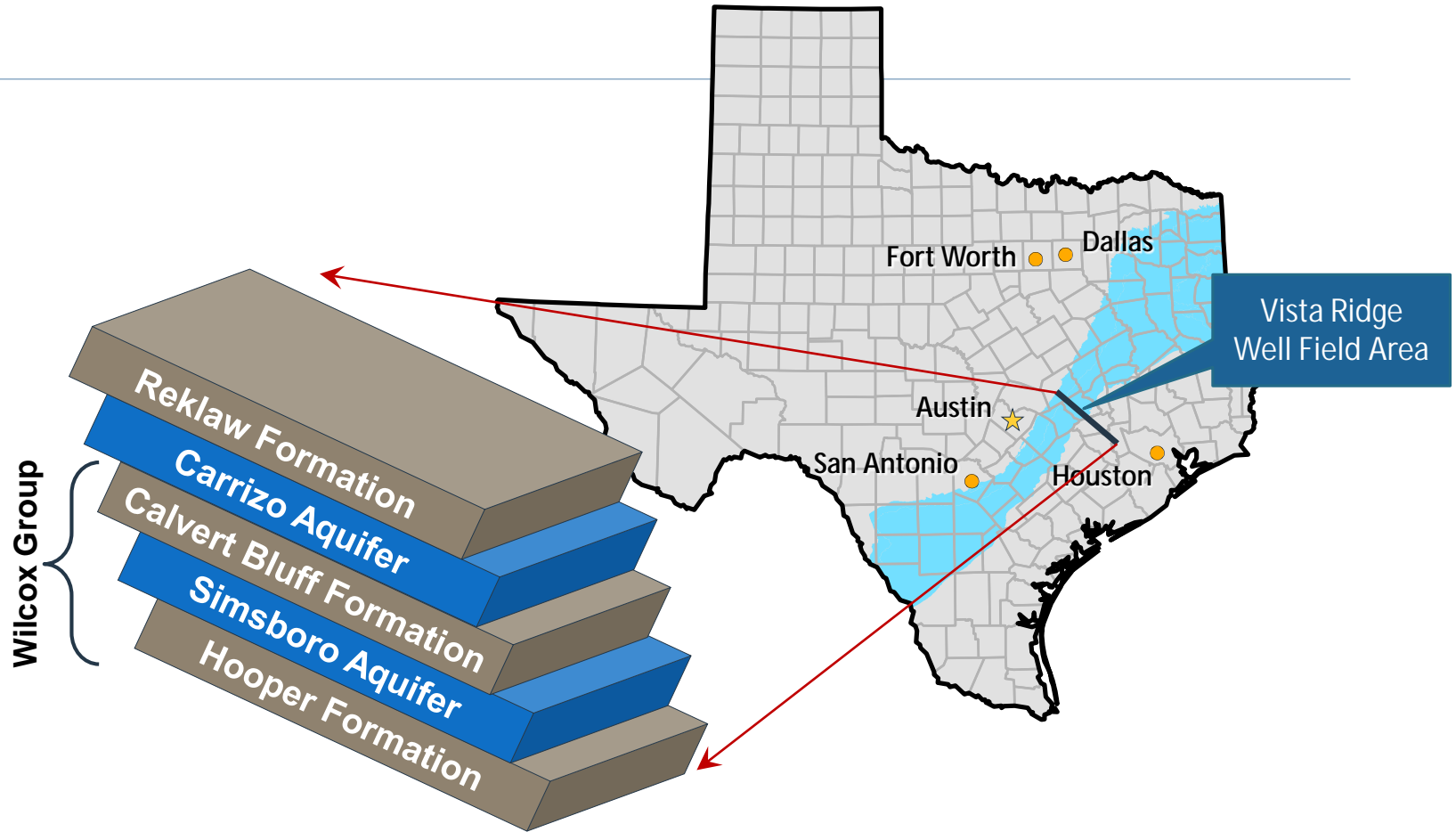
Reinstate 3000 GPM well production rates

	Previous	Current
PW-12	3,000	2,617
PW-13	3,000	2,685
PW-16	3,000	2,412

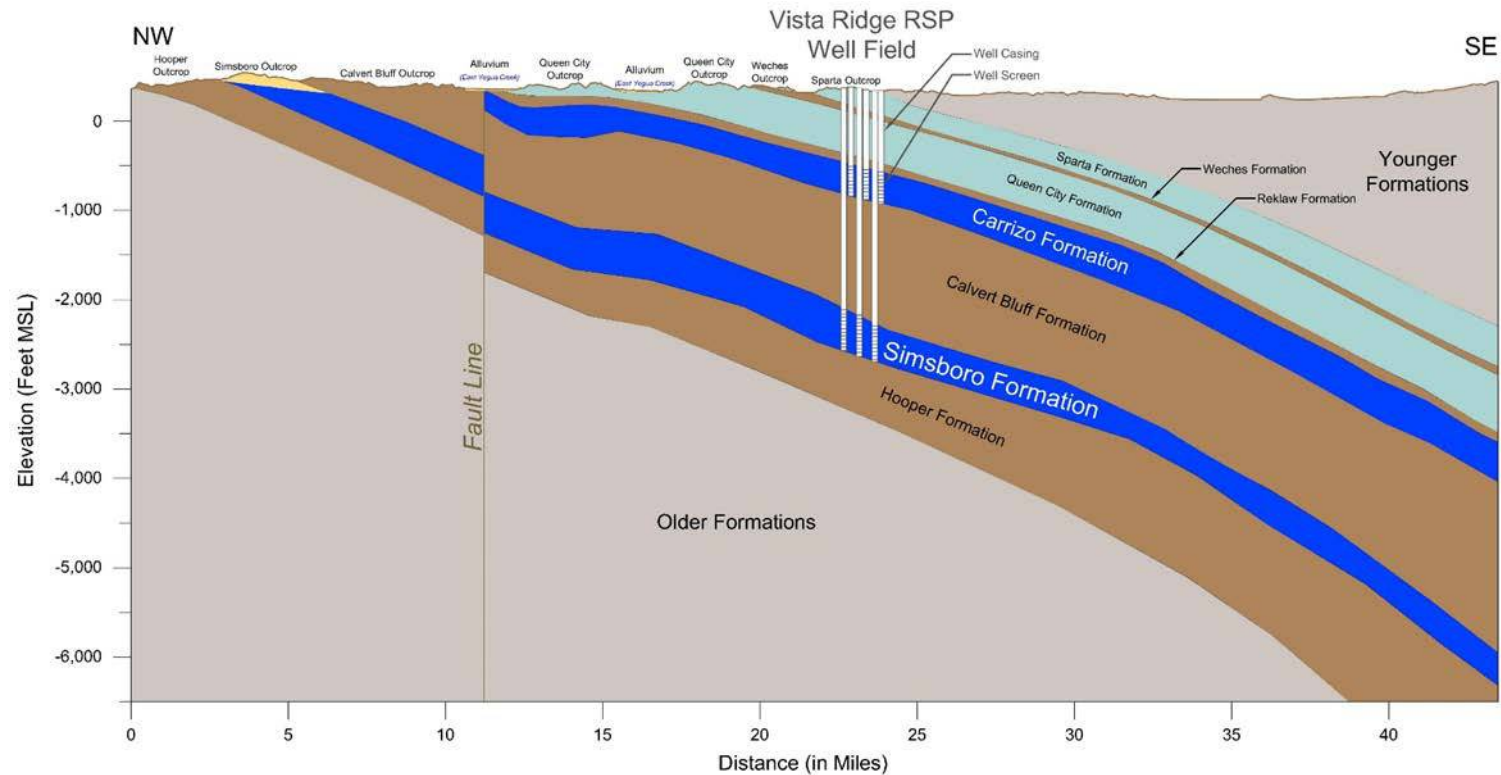
- Well relocations were to accommodate landowner requests and because of topography/drainage

Overview of Vista Ridge Hydrogeology and Modeling

Carrizo-Wilcox Aquifer



Aquifer Cross-Section



15x Vertical Exaggeration
Ground level source: USGS National Elevation Dataset (NED)
Fault source: Geologic Atlas of Texas - Austin Sheet (1974)
Formation surface source: Central Carrizo-Wilcox, Queen City, and Sparta Groundwater Availability Model (GAM)

Groundwater Availability Model (GAM)

- Central Texas Carrizo-Wilcox-Queen City-Sparta GAM
- Updated in 2018
- Updated model doesn't accurately represent the hydraulic conditions in the Vista Ridge well field area
- GAM corrected to include Vista Ridge pump testing information

GAM Modifications

Simsboro Well PW-13 tested in 2015

- Documented regional Simsboro transmissivity of approximately 110,000 gal/day/ft

Current GAM includes transmissivity of about 45,000 gal/day/ft to 55,000 gal/day/ft in Vista Ridge area

- Current GAM over-predicts drawdown by approximately 150 feet in Vista Ridge well field area

Modified version of the GAM that includes corrected transmissivity used to model aquifer response (MODGAM)

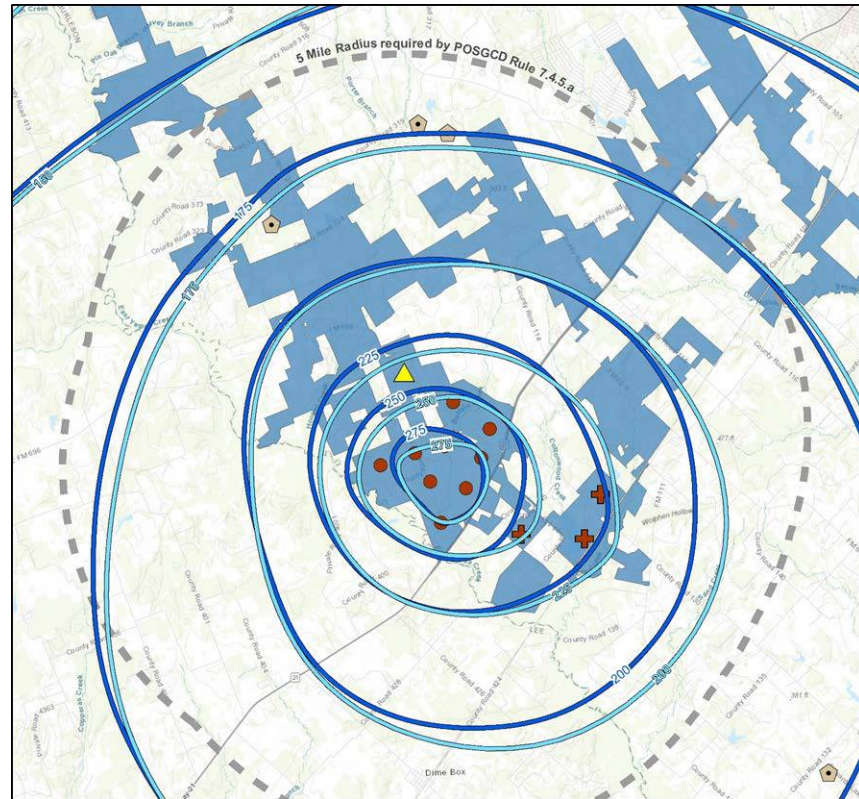
Amendment 1 MODGAM Results

Relocate PW-18

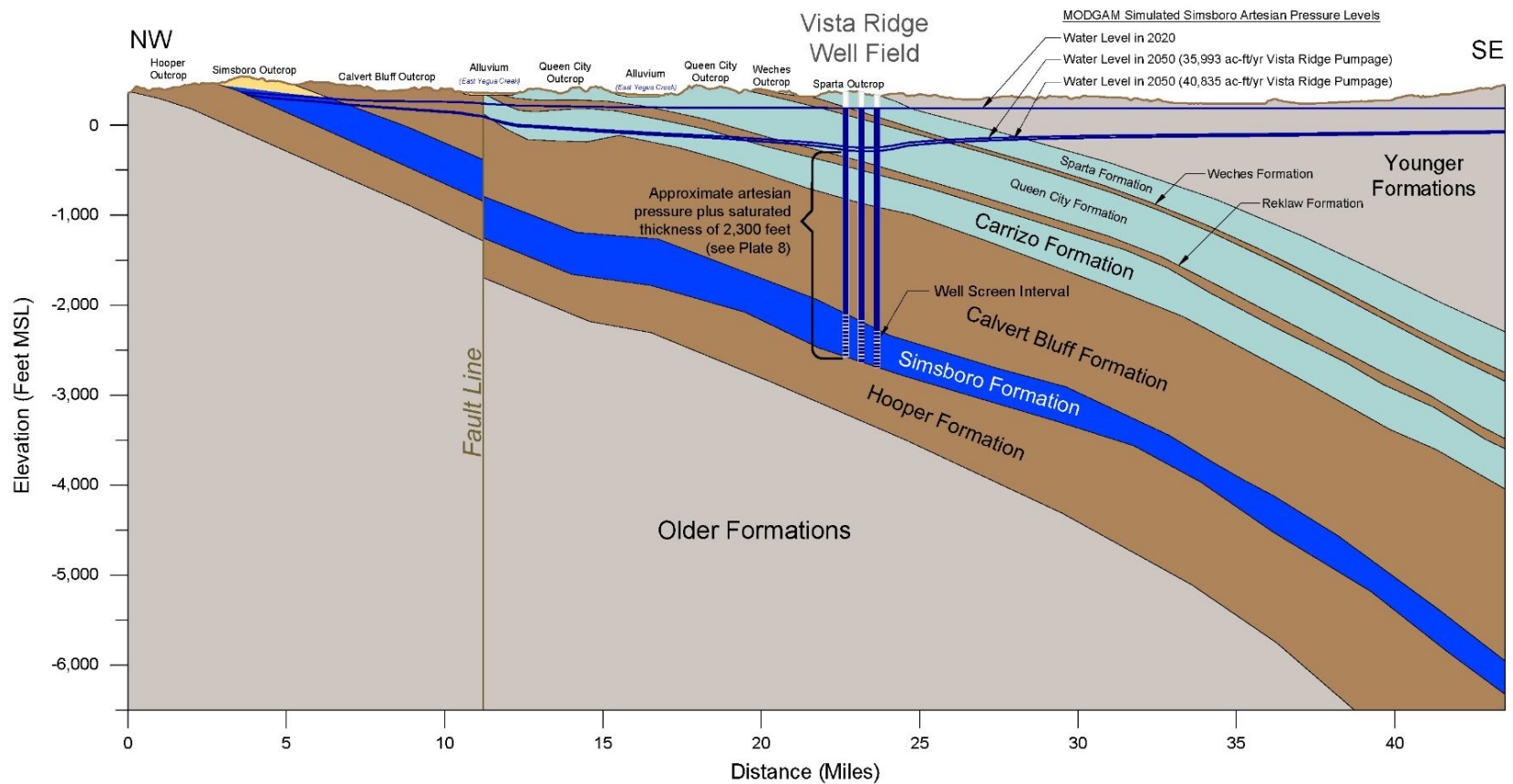
Contours show 30-Year Simsboro Artesian Pressure Decline

Light contours show
drawdown from permitted
PW-18

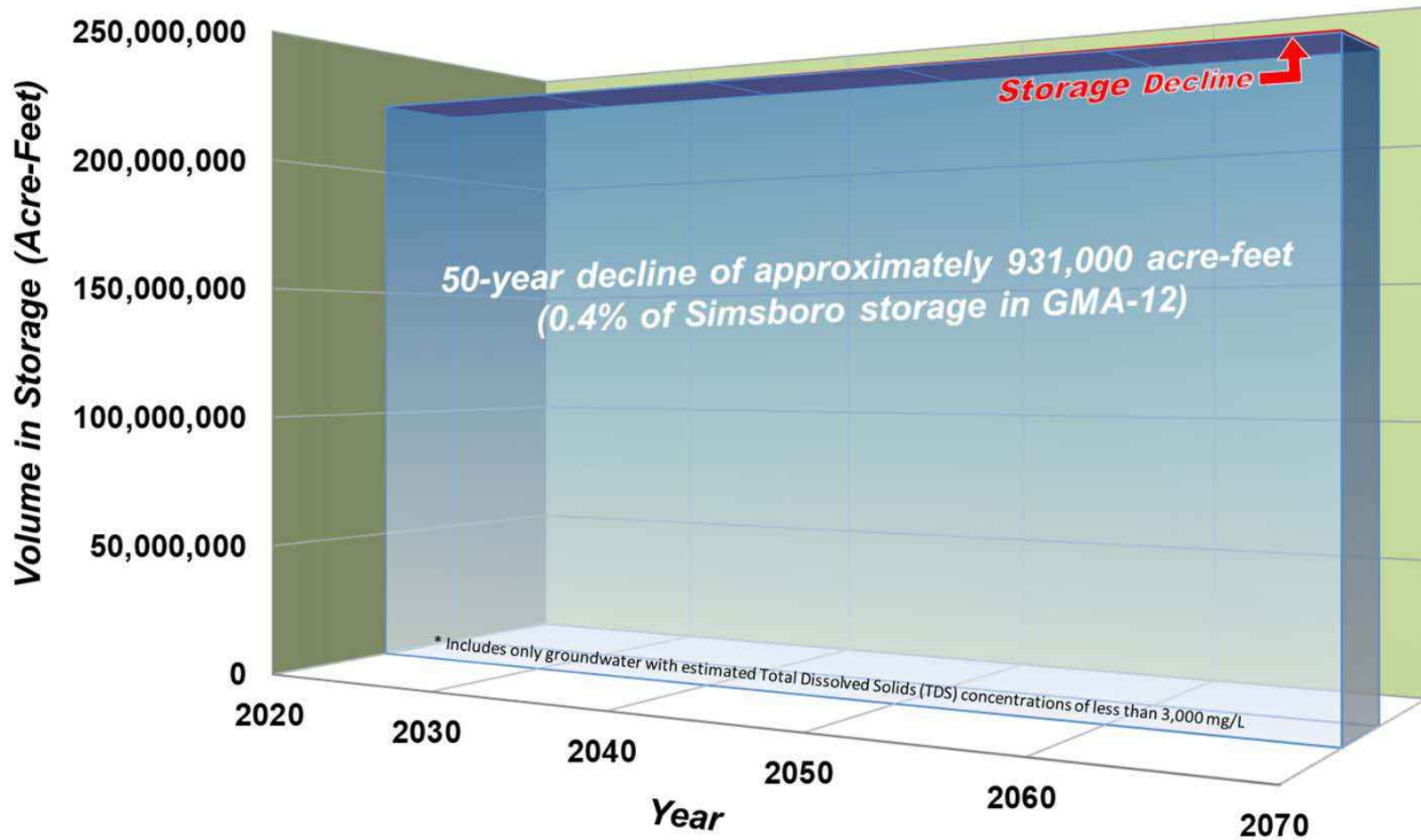
Dark contours show
drawdown from proposed
PW-18 site



Amendment 2 MODGAM Results



Simsboro Storage (GMA-12)



Subsidence

Subsidence prediction using three models (GAM, MODGAM, and Obsolete GAM) described in Technical Memorandum included with permit amendment application submittals

Maximum predicted subsidence at the Vista Ridge well sites due to additional requested production (Amendment 2) is approximately 1.5 inches to 2.8 inches over 30 years

The predicted subsidence is small, will not result in flooding in low-lying areas, and is evenly distributed over a large, multi-county area

Models likely over-predict subsidence due to coarse vertical discretization of confining formations

Desired Future Conditions (DFC)

Average drawdown (2000-2069) due to 40,835 acft/yr Vista Ridge pumpage plus DFC (PS-12) regional pumpage:

- Approximately 282 feet in POSGCD (36 feet below DFC limit of 318 feet)
- Approximately 156 feet in GMA-12 (72 feet below DFC limit of 228 feet)

Groundwater Conservation District (GCD) or County	Desired Future Condition (DFC) Average aquifer drawdown (feet) measured from January 2000 through December 2069					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
Brazos Valley GCD	12	12	61	125	295	207
Fayette County GCD	47	64	110	--	--	--
Lost Pines GCD	5	15	62	100	240	165
Mid-East Texas GCD	5	2	80	90	138	125
Post Oak Savannah GCD	28	30	67	149	318	205
Falls County					-2	27
Limestone County				11	50	50
Narvarro County				-1	3	3
Williamson County	--	--	--	-11	47	69
GMA 12	16	16	75	114	228	168

http://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA12_DFC_2016.pdf

Simsboro DFC in POSGCD is 318 feet

Simsboro DFC in GMA-12 is 228 feet

Permit Amendment 3

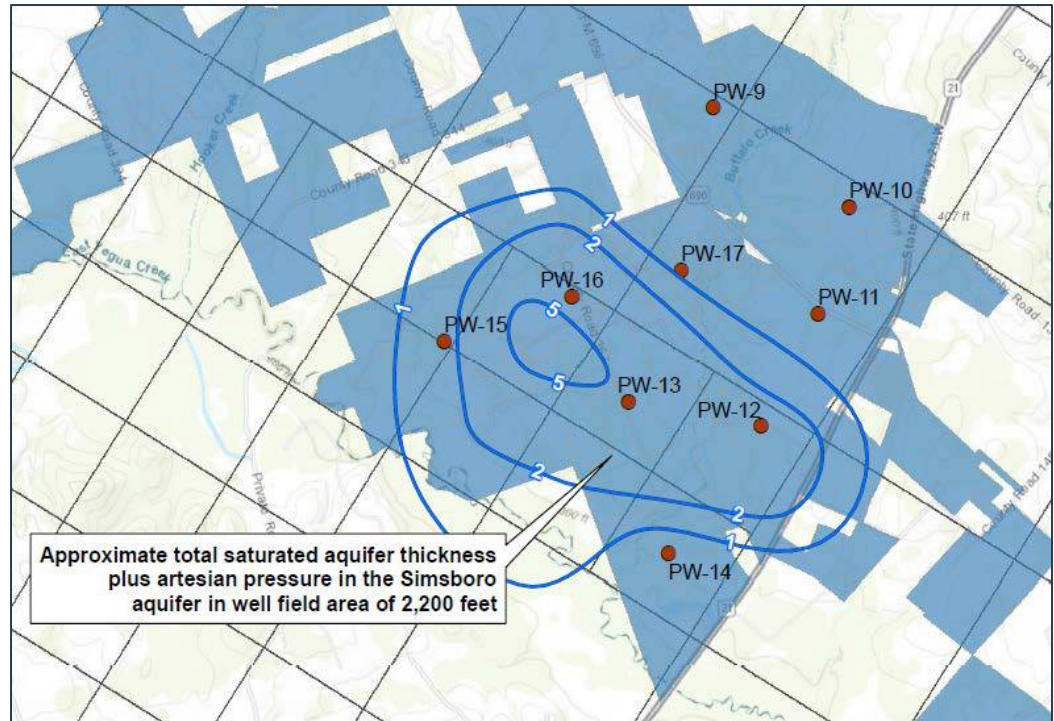
Amendment 3: Reinstate 3,000 gpm Well Production Rates

- Minor relocation of wells for practical issues (access, drainage, etc.)
 - Instantaneous maximum well production rates are tied to well spacing (Rule 4.1)
 - Spacing between some well sites less than 3,000 feet; permitted maximum production rates reduced
- Restored well yields provide operational flexibility for public supply system
- Increased maximum well yield results in insignificant additional drawdown that affects only Vista Ridge wells

Amendment 3 MODGAM Results

Reinstate 3,000 gpm
maximum well production
rates

Contours show additional
30-Year Simsboro Artesian
Pressure Decline



Summary

Amendment 1: Relocate PW-18

- Reduced project footprint
- Increased efficiency of public supply system
- Insignificant change in aquifer response

Amendment 2: Increase Simsboro Production (4,842 acft/yr)

- Increased public water system flexibility and reliability
- Necessary to deliver contract volume
- Modeled aquifer response is consistent with currently-adopted DFC

Summary (Cont.)

Amendment 3: Reinstate 3,000 gpm maximum well production rates

- Provides operational flexibility for public supply system
- Added artesian pressure drawdown is insignificant and impacts Vista Ridge wells only

Amendment 4: Conform transport permit to changes made in operating permit



Questions?